Microsoft Dynamics™ NAV 5.00

Automated Data Capture Systems for Microsoft Dynamics™ NAV

Microsoft Dynamics

AUTOMATED DATA CAPTURE SYSTEMS FOR MICROSOFT DYNAMICS™ NAV

PREFACE

Microsoft Dynamics™ NAV is a collaborative business management solution for medium-sized companies. It is an integrated solution that includes functionality to support financial and relationship management, distribution, manufacturing, advanced warehouse-handling module (WMS) and, now, the use of handheld devices in warehouse processes.

Dynamics NAV Automated Data Capture Systems is aimed at companies that need to use handheld devices in their warehouse processes.

This installation guide is part of the Dynamics NAV Product Specialist Training, Supply Chain curriculum, and is aimed at resellers and implementers of Automated Data Capture Systems (ADCS).

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Chapter 1

Introduction

This chapter contains the following sections:

- About the Installation Guide for ADCS
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- Introduction to ADCS

1.1 About the Installation Guide for ADCS

The purpose of this installation guide is to give the resellers and implementers of ADCS a full understanding of the installation procedures for the application.

Installation Requirements

In order to use the ADCS functionality, additional Microsoft Dynamics™ NAV products besides the standard client must be installed. The additional programs are ADCS, C/SIDE Database Server for Microsoft Dynamics NAV and Application Server for Microsoft Dynamics NAV (NAS). In addition, the .NET Framework 1.1 and MSXML version 3 must be installed.

Operating System

This installation guide is based on the Microsoft Windows XP Professional operating system.

C/SIDE Database Server and NAV Application Server require either Windows XP or Microsoft Windows Server 2003.

1.2 Overview

Using accurate data in warehouse documents is essential to keeping inventory accuracy in regards to item number and quantity. In supply chain operations, companies are experiencing increased pressure for faster operations. Working with batches of data capture represents a problem because it means that the warehouse workers must make a number of return trips to their desks to enter the collected information. Online operation with the use of radio frequency technology provides the user with continuous validation of every single item movement in the warehouse.

Along with the pressure for faster operations, the high staff turnover that many companies experience makes it harder and more time-consuming to make items known to and recognized by a number of inexperienced staff. This means that it is essential for a supply chain company to have a fast and accurate method of recording item data. Currently, the fastest and most reliable method of doing this is by using bar codes in connection with a number of different possible capture systems.

The Automated Data Capture Systems (ADCS) granule provides companies with the necessary functionality to capture accurate data for inbound, outbound and internal documents, primarily in connection with warehouse activities.

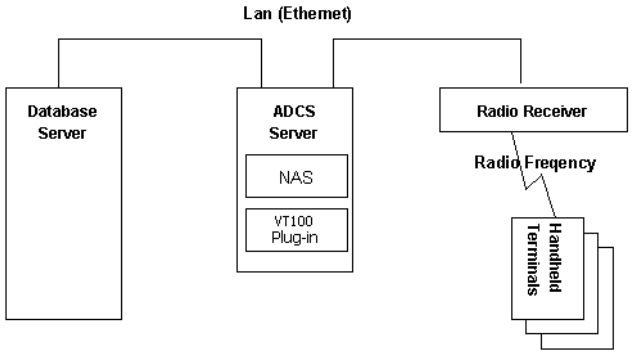
This document first describes how to set up ADCS for Dynamics NAV. It then explains how the operating system is managed in connection with the use of ADCS.

Note

Item tracking information such as lot number and serial number tracking is not supported in this version of ADCS.

1.3 Introduction to ADCS

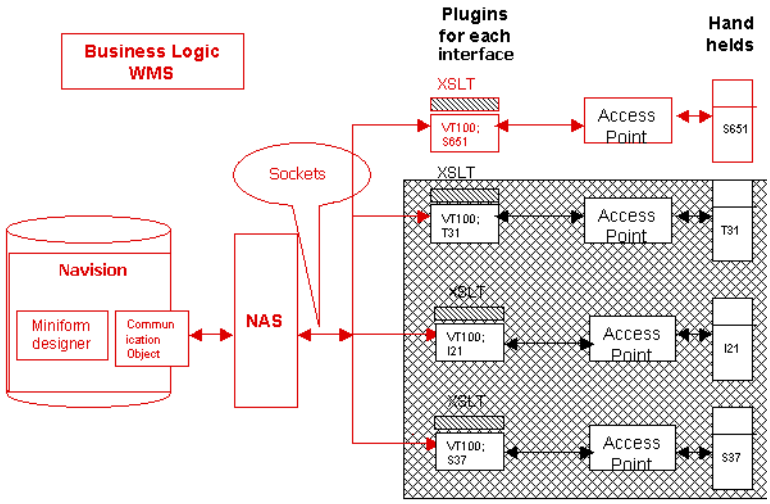
The ADCS solution is designed around the NAV Application Server. The NAV Application Server (NAS) can be compared to a normal Dynamics NAV client without the user interface. However, it is possible to communicate with the NAS via the VT100 Plug-in that supports the protocol used by the handheld terminals.



The NAS is responsible for processing data coming to it from the handhelds and sending the appropriate response back to them. A standard XML format is used to send and receive the data.

The VT100 Plug-in is responsible for ensuring that the response from the NAS is directed to the correct handheld, thus reducing the load on the NAS.

The VT100 Plug-in provides the link between the NAS and the Access Points for the handhelds and acts as a virtual Telnet server. All connection requests and data transmissions are handled by this service, and the incoming native protocol is transformed into standard XML that the NAS can interpret. Once a request has been transformed, it is forwarded by the VT100 Plug-in to the NAS. When a reply is received, it is converted from XML into the native protocol of the handheld. Function keys are mapped using an XSLT file that may be modified by the end user. Once the data has been transformed and formatted, it is forwarded to the handheld.



This diagram illustrates the technical design of the ADCS solution. The functionality covered by the checkered area is not part of the standard solution but could be developed by a third party.

For a quick overview of typical procedures associated with specific ADCS activities, read the respective topic in the online Help.

Types of Handhelds and Performance

All character-based handhelds that have a VT100 interface will work with ADCS, although you may have to implement minor adjustments with some models. With any handheld, you must be able to connect either the Access Point or the RF terminal to the IP or port address of the ADCS server.

If you want to use a graphics-based handheld, you will have to develop your own plug-in.

A setup with one NAS server and 10 remote terminals has been tested with good performance results. In theory, you should be able to connect any number of handheld devices to the VT100 Plug-in. However, if performance becomes an issue, you can always add an extra NAV Application Server server and direct the VT100 plug-in to also connect with the new NAV Application Server to achieve improved performance.

Chapter 2

Installation

This chapter contains the following sections:

- Installation Procedure

2.1 Installing ADCS

ADCS has been designed to be used with access to a network. Without network access, it will not work.

However, if you want to install ADCS on a PC without access to a network and use it for demonstration purposes, you can install a Microsoft Loopback network adapter.

Using ADCS without a Network Connection

When not connected to the network, you must disable your normal network adapter and enable the Loopback adapter. Do the opposite when you have connection to a network.

To install the Loopback network adapter, use the Add/Remove Hardware wizard in the Control Panel. During the installation, make the following selections:

- Add/troubleshoot a device
- Add a new device
- No, I want to select the hardware from a list
- Network Adapters
- Microsoft
- Microsoft Loopback Adapter

This installation manual is based on a situation where you have access to a network.

The installation of ADCS consists of multiple application installations from the Microsoft Dynamics NAV 5.0 Product CD.

Important

In order for the ADCS to function, we recommend that you install the C/SIDE Database Server, NAV Application Server, and the VT100 plug-in on the same computer.

Dynamics NAV Client Installation

1 Put the product CD in your CD drive and hold down the SHIFT key while the CD is spinning up. Click Start, Run, Browse, and browse to your CD drive.

2 Click Programs, Microsoft Dynamics NAV.

The programs that you need are the Dynamics NAV C/SIDE Client, C/SIDE Database Server, NAV Application Server (NAS) and the ADCS application. We strongly recommend that you start by installing the client. If you install the client first, you will not have to specify the path of the database to the database server later.

3 Click the Client folder and then the click the setup file.

4 Follow the instructions in the installation wizard and when prompted, select the typical installation.

When this installation is complete, you will have installed the client. The next step is to install the C/SIDE Database Server.

Database Server Installation

1 On the product CD, locate the installation program for the C/SIDE Database Server and then double-click the setup file.

2 Follow the instructions in the installation wizard and when prompted, select the typical installation.

Note

You must copy your license file to the database folder. Remember to rename the file to fin.flf after copying.

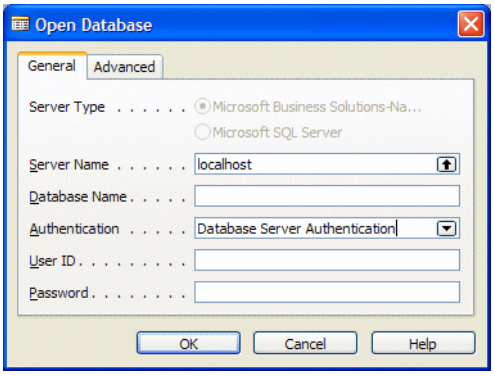
When this installation is complete, you will have installed the Database Server. To test that the Database Server can access the database:

Test the C/SIDE Database Server Installation

1 Start the Dynamics NAV C/SIDE Client.

2 Click File, Database, Close.

3 Click File, Database, Open.



4 In the **Server Name** field, enter *localhost*.

5 In the **Authentication** field, select *Database Server Authentication*.

6 Click OK.

7 If the Navigation Pane appears, the database server can connect to the database. If you get an error, investigate and fix the problem so that the Database Server can access the database.

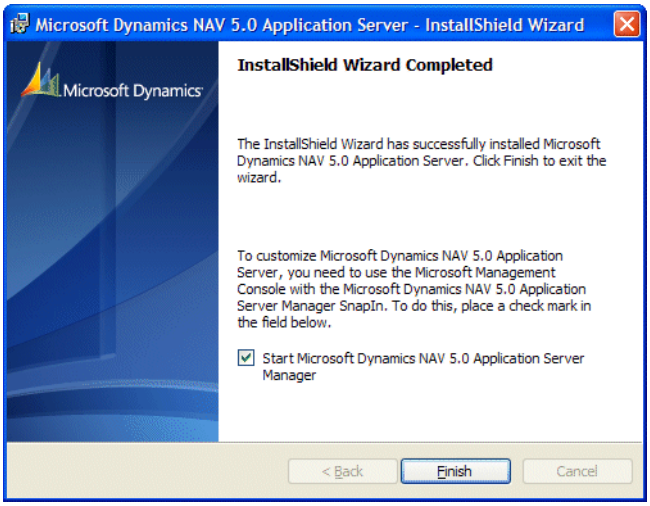
The next step is to install the Application Server for Microsoft Dynamics NAV (NAS).

NAS Installation

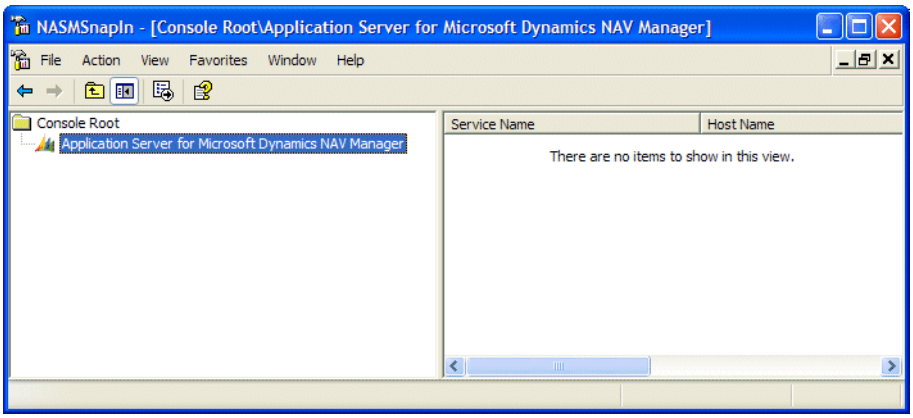
1 On the product CD, locate the installation program for the Application Server for Microsoft Dynamics NAV and double-click the setup file.

2 Follow the instructions from the installation wizard and when prompted, select the typical installation.

Near the end of the installation process, the wizard will ask whether you would like the NAV Application Server to be started when the installation is finished. To answer yes, enter a check mark in the field.



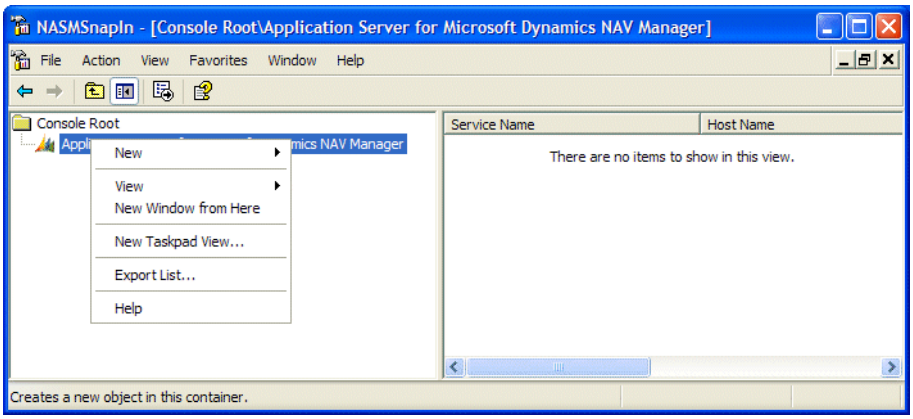
3 Click Finish, and the ***Microsoft Management Console*** window will open.



You are now ready to configure the application server.

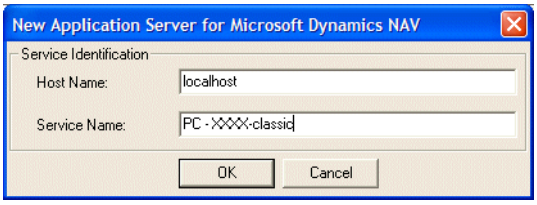
NAS Configuration

4 In the the left-hand side pane, right-click on Application Server for Microsoft Dynamics NAV Manager and then click New, Application Server.

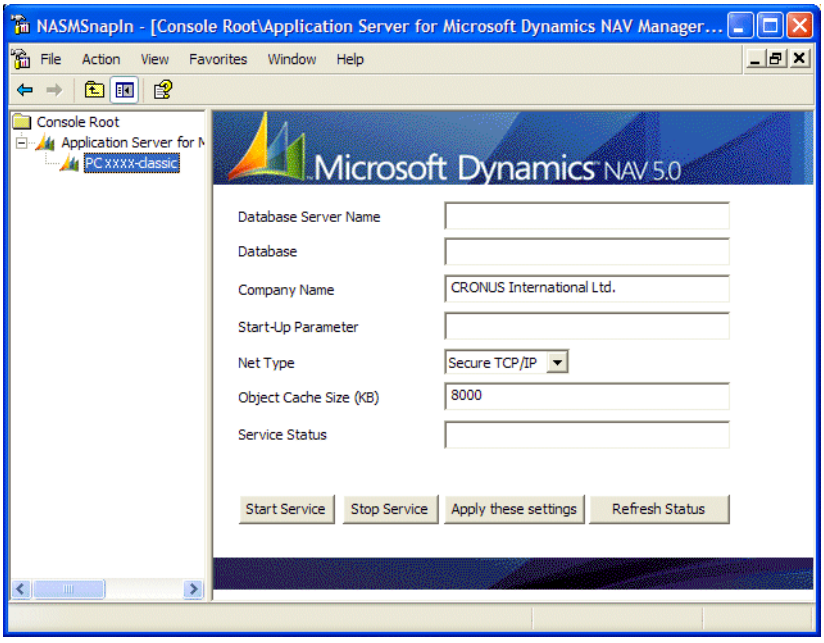


The ***New NAV Application Server*** window appears.

5 Enter your computer's network name in the **Service Name** field with the extension *-classic* at the end and click OK.



You have now filled in the ***New NAV Application Server*** window, and you must now fill in the fields to configure the NAS.



6 The **Company Name** and the **Net Type** fields may be already filled in; if not, fill these fields according to the company information of the application.

7 In the **Database Server Name** field, enter *localhost*.

8 In the **Company Name** field enter the name of the company that you want the NAS server to access in the Navision database.

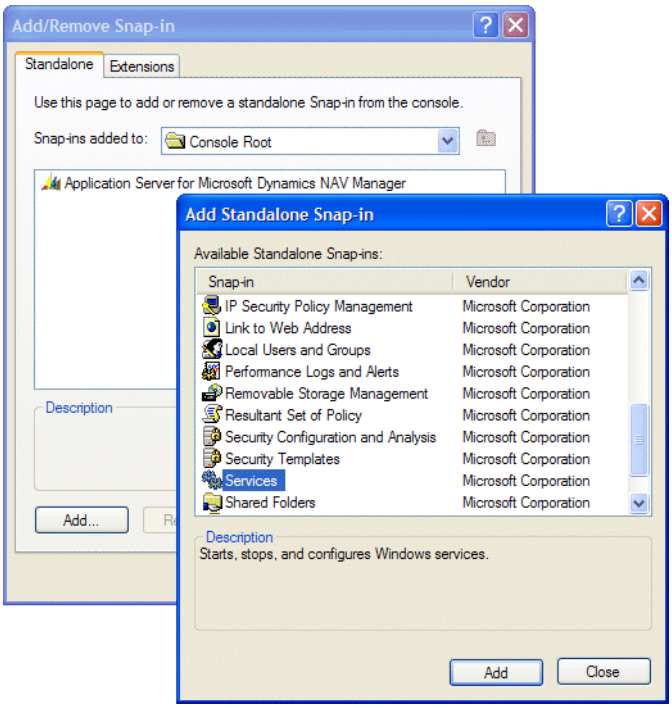
9 In the **Start-Up Parameter Value** field, enter *ADCS ADCSID=11322*. The first *ADCS* specifies the NAS Type. ADCS then requires a unique ID for each Application Server. This is specified by the required text *ADCSID=* followed by the TCP Port number. In this example, the port number is 11322, which is the number used in codeunit 7700.

10 In the **Object Cache Size** field, enter *8000*.

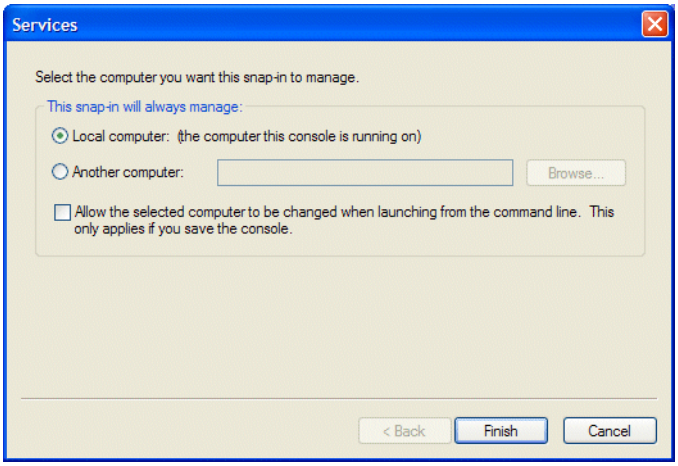
To make the application server available for the user of the computer, you must make a few preparations. You must make Windows Services and the Windows Event Viewer visible and apply them to the ***Console Management*** window.

To make the application server available:

1 In the ***Console Management*** window, click File, Add/Remove Snap-in. In the ***Add/Remove Snap-in*** window, click Add to open the ***Add Standalone Snap-in*** window:



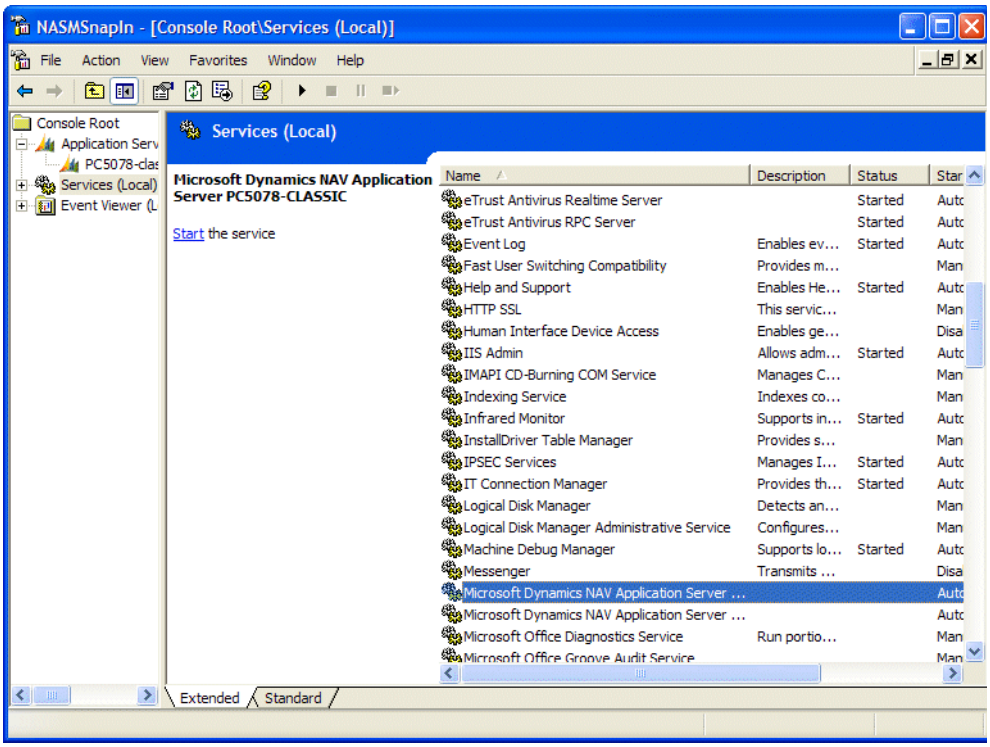
2 Select Services and click Add.



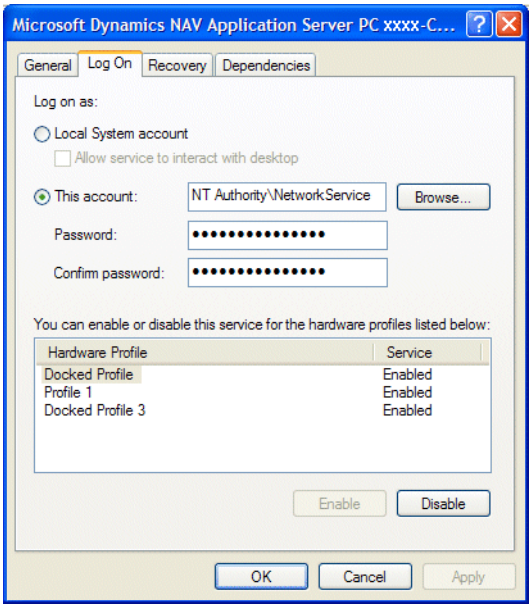
3 Click **Local Computer** and click Finish to add the Services to your ***Console Management*** window.

4 In the ***Add Standalone Snap-in*** window, select Event Viewer and click Add to add the Event Viewer.

5 In the ***Console Management*** window, click Services and select Application Server for Microsoft Dynamics NAV.



6 Right-click Application Server for Microsoft Dynamics NAV and click Properties. In the ***Properties*** window, click the ***Log On*** tab.



7 Click **This Account** and enter your user name and Windows login password.Confirm the password and click OK. If you are connected to a Windows Domain, enter your Windows login as *Domain name\login*.

Note

Remember to copy your license file to the database and application server folders. Remember to rename the file to fin.flf after copying.

Finishing the installation

Before you start the NAV Application Server, you must register a SocketBusAdapter for the NAV Application Server to enable it to communicate with the VT100 Plug-in.

A SocketBusAdapter is included in the DevKit on the product CD. You can install the complete DevKit or just copy the `SocketBusAdapter.dll` and `NSComCom2.dll` and then use regsvr32 to register them.

You can now install the last program needed to complete the installation of ADCS.

ADCS Installation

1 Open the Dynamics NAV database that you want to update and import the FOB file provided.

2 Open Codeunit 1 in design mode and implement the changes specified in the file: *Codeunit1_Procedure99.txt*

Note

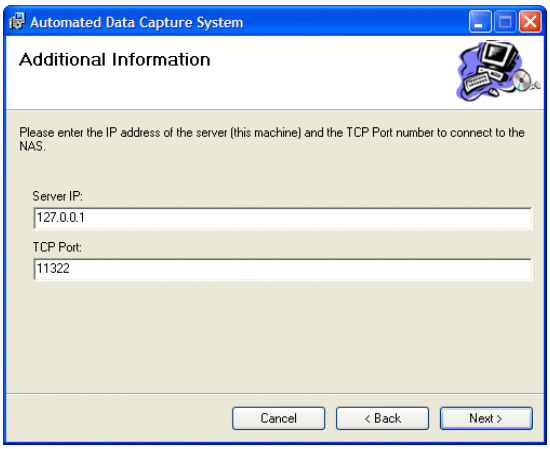
Make sure the license file you are using is updated to match the new objects included in the FOB-file.

3 Browse to the directory where Automated Data Capture System (ADCS) installation program is stored and run the setup file and follow the instructions in the Installation Wizard.

4 During the installation, you will be asked to enter the IP address of the server. This is the machine on which you are installing ADCS.

You can find the IP address of your machine by typing *IPconfig* into the DOS prompt of your system.

5 Enter the number of the TCP Port:



6 When prompted, select the folder on your hard drive that contains the Dynamics NAV applications you have just installed.

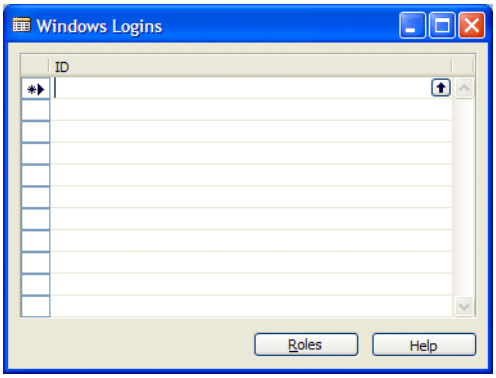
When the installation is complete, you have finished installing Automated Data Capture Systems for Dynamics NAV 5.0.

ADCS Configuration

Your must now configure Dynamics NAV to use the ADCS application:

1 Click Start, Programs,Microsoft Dynamics NAV, C/SIDE Client and the Dynamics NAV application starts.

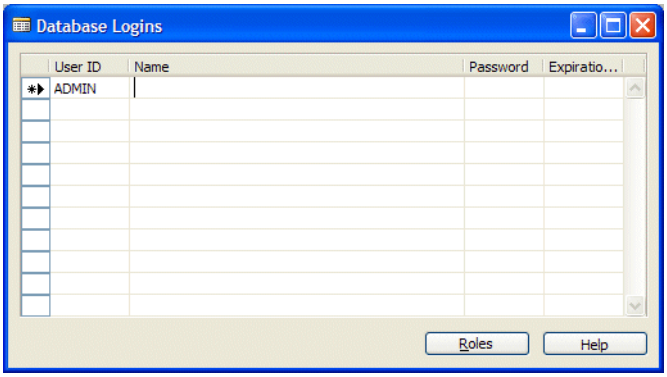
2 Click Tools, Security,Windows Logins to open the ***Windows Logins*** window:



3 Add the same user that you added on the NAV Application Server.

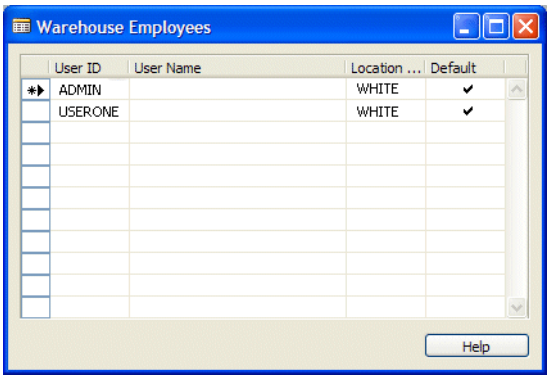
4 Click Roles and give this user the Super role by selecting the *Super* Role ID.

5 Click Tools, Security, Database Logins to open the ***Database Logins*** window:



6 Add one or more users and assign them the appropriate roles. In this example, ADMIN is the user and SUPER is the role.

7 In the Navigation Pane, click Administration, Application Setup, Warehouse, Setup - Warehouse, Employees.



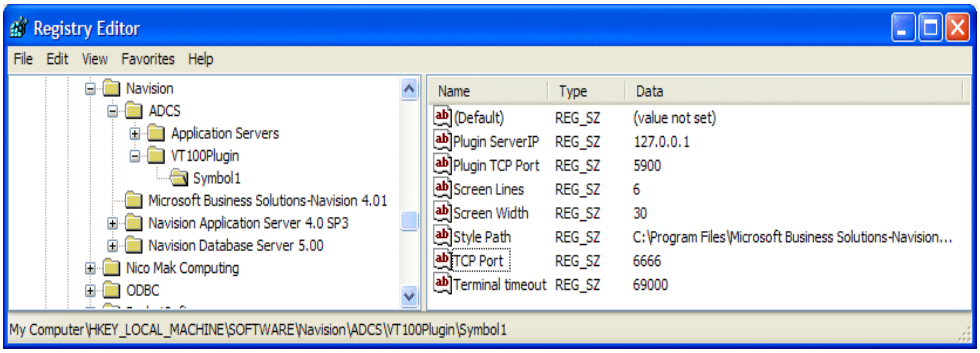
8 Enter the users you previously inserted and fill in the Location. In this example, ADMIN and USERONE are set up to work in the WHITE location. They can be set up to work with other locations, but the WHITE location is their default location.

Changing the Parameters for a Handheld Device

If you want to change the value of the TCP port or the number of lines and width in the handheld device screen in the VT100 plug-in, go to the Windows Registry.

To edit the registry:

1 Click Start, Run and enter *regedit* in the **Open** field to open the ***Registry Editor***:



2 To change an entry, right-click it and select Modify.

3 Click OK to confirm the values. Remember to restart the VT100 Plug-in Services after making these changes to the registry.

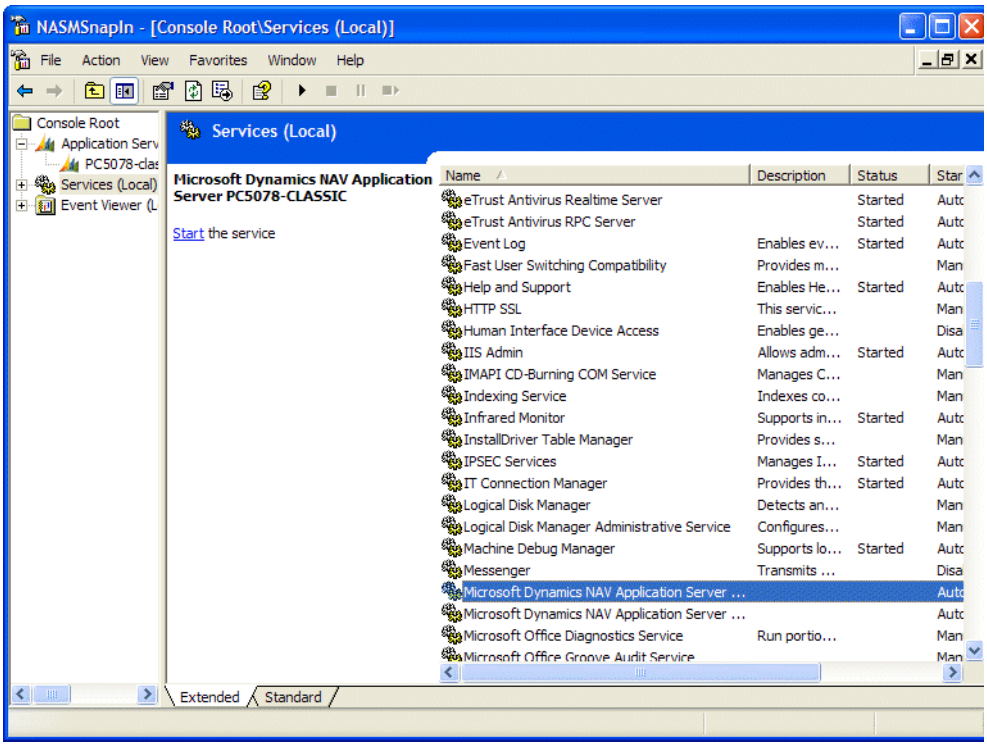
Check that the services have started up correctly and are running. The services are:

- Application Server for Microsoft Dynamics NAV– (classic)
- C/SIDE Database Server for Microsoft Dynamics NAV
- Navision VT100 Plugin

To check these services:

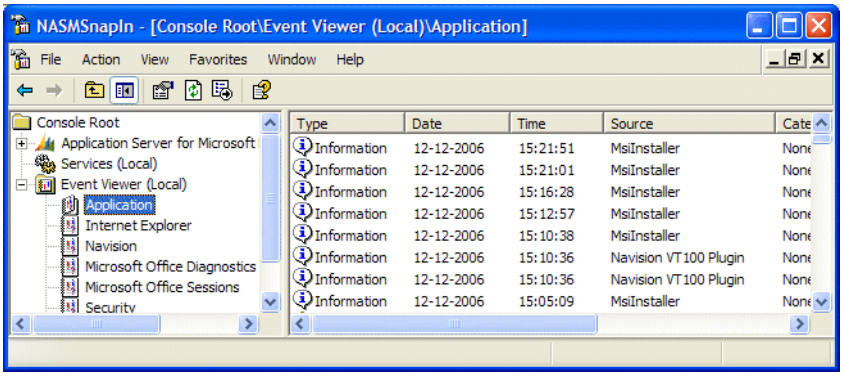
1 Click Start, Programs, Microsoft Dynamics NAV, Application Server Manager.

2 Click Services.



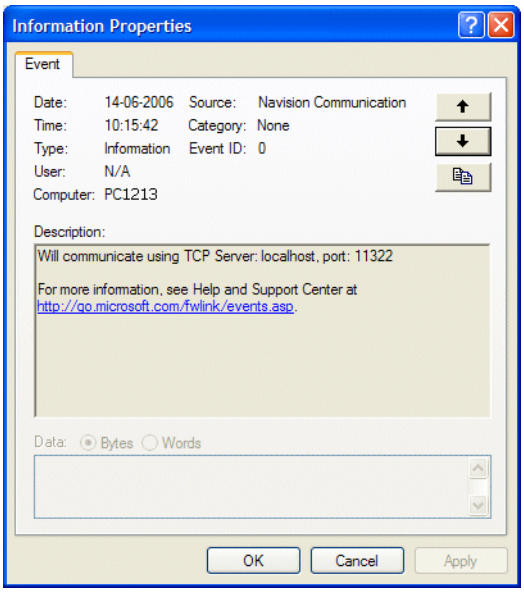
3 Make sure that the NAV Application Server service and the Dynamics NAV VT100 Plugin service have started.

4 Select the Application Log.



None of the information lines displayed in the log should have a warning. If one or more does have a warning, click the event in question and correct the problem

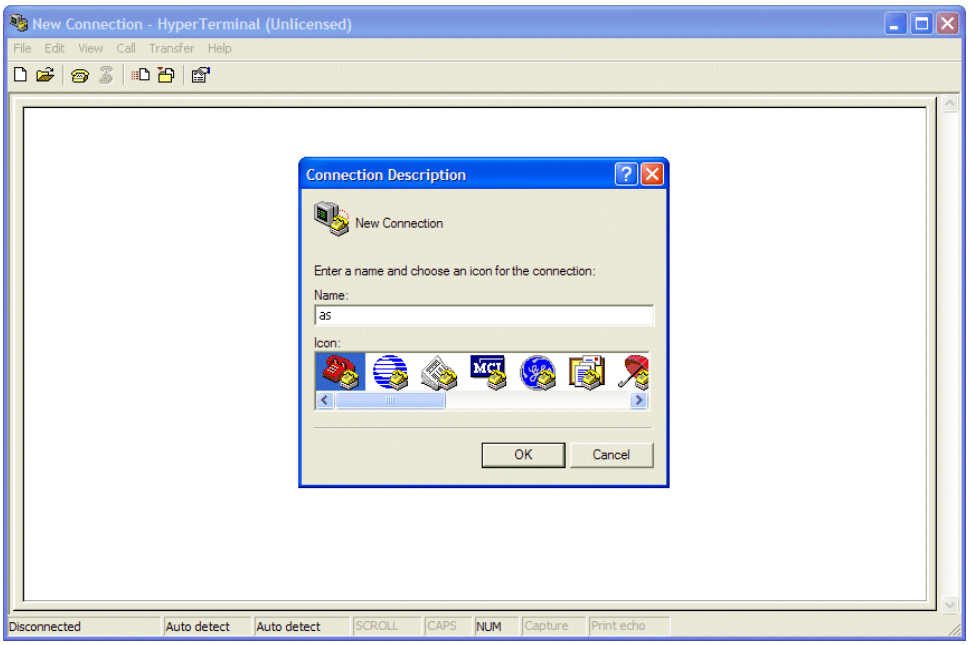
according to the information given in the Event Viewer. You can also see TCPport number by looking at the properties for the line.



Using HyperTerminal to Test the Connections

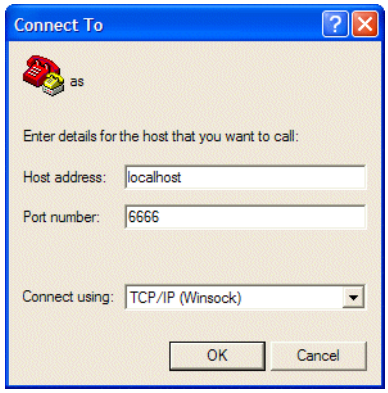
If a handheld device is not present, you can test the connection within the HyperTerminal, a Windows application.

1 Click Start, Programs, Accessories, Communication, HyperTerminal.



2 Enter a suitable name for the connection. In this case, we chose *as* for the application server.

3 Select the connection *TCP/IP (Winsock)*.

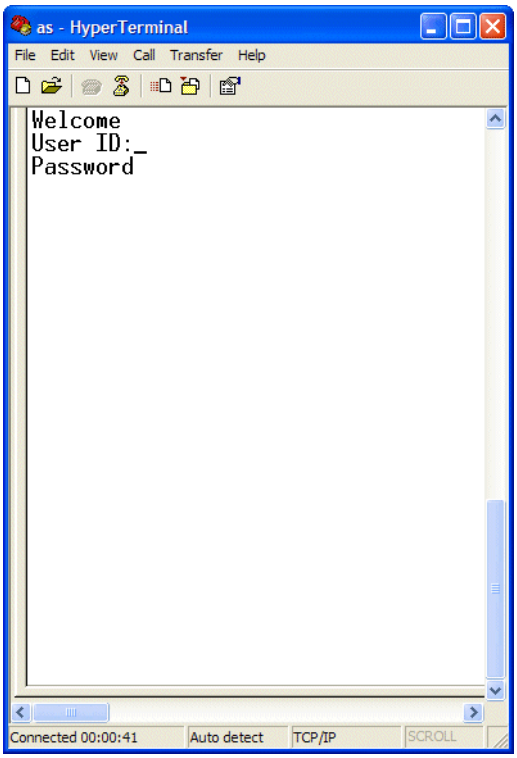


4 In the **Host address** field, enter the IP address of the machine that is running the VT100 Plug-in service. In this case you can also enter localhost as everthing is installed locally.

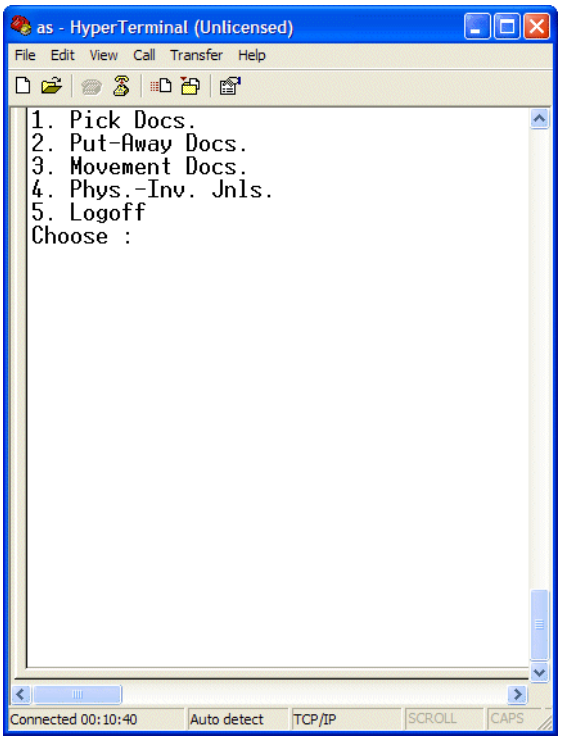
5 In the **Port number** field, enter *6666* or the port number that the VT100 Plug-in is listening on. You must do this because when you are using Hyperterminal or a hand held device, you are connecting to the VT100 Plugin and not to the NAV Application Server.

   The TCP port should be the same as the one you see in the Registry Editor.

6 Click OK.



7 Enter the User ID (ADMIN or USERONE, in our example) and password (if any) and press ENTER.



8 Select one of the options, such as number 1, Pick Docs.

This data is the same as what you would see on a handheld device. The number of lines displayed on a handheld device depends on the ability of the equipment in use and the setup of the device.

Chapter 3

Forms and Functions

This chapter contains the following sections:

- Miniforms
- Functions
- Identifier
- New Forms, Tables and Codeunits

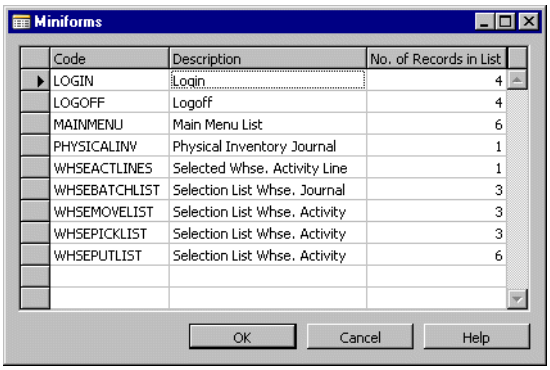
3.1 Miniforms

Miniforms are used to define the amount of information displayed on the handheld. This information can be data originating from tables (such as a list of documents the user can select from), text information (such as the main menu), comments that can be used to show error messages, or positive results to activities processed by the user, or any combination of these.

Miniforms are designed so that each form represents a series of one or more actions that are to be carried out by the handheld. Miniforms that contain more than one action will be repeatedly sent until all the actions are completed, or until the user leaves the form by using an escape function.

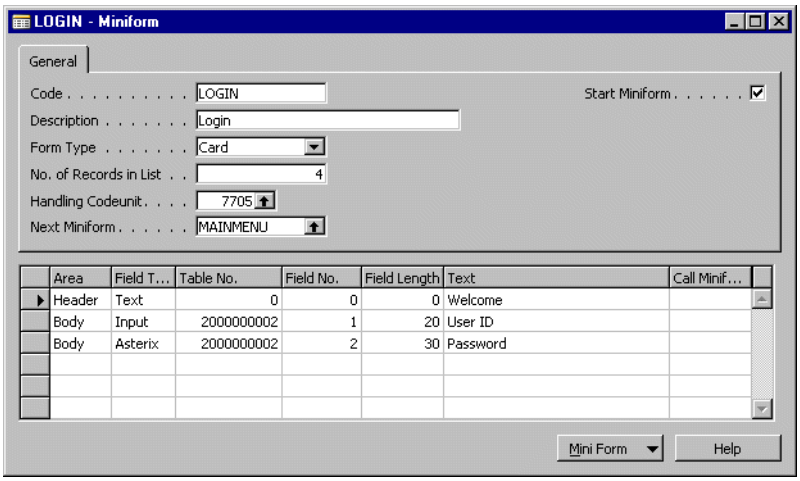
There are nine miniforms in the demo data, each with specific values. The existing forms are:

- LOGIN
- LOGOFF
- MAINMENU
- PHYSICALINV
- WHSEACTLINES
- WHSEBATCHLIST
- WHSEMOVELIST
- WHSEPICKLIST



In the Navigation Pane, click Administration, Application Setup, Warehouse, Setup – ADCS, Miniforms.

You can modify and create miniforms in the ***Miniform*** window:



Miniform Window Header

The **Code** field represents a code to identify the miniform. The **Description** field is a description of what the form is used for. The **Form Type** field consists of four different types, from which you can choose the following:

- *Card*: The form is a card-type form that can show text. Only used for Login.
- *Selection List*: A list-type form that contains a text list from which the user can make a selection (such as the main menu).
- *Data List*: A list-type form that contains a list of data where the user can choose a document (such as Pick Documents).
- *Data List Input*: A list-type form that contains a list of data where the user can enter data (such as Warehouse Activity Lines).

Note: There are five columns on the form window.

The **Handling Codeunit** field contains the number of the miniform-specific codeunit that will contain all the functions for this miniform. In the example shown above, the codeunit 7705, Miniform Logon, is the codeunit that contains all the functionality and reactions for functions for the LOGIN miniform.

The **Next Miniform** field specifies which form will be shown next when a selection is made in a data list form or when the last field is entered on a card form. This field is only available for data list or card type forms. In the example above, the program will call the MAINMENU miniform after the user has entered information in the last field on the LOGIN form, which is Password.

The **Start Miniform** checkbox in the header indicates that this will be the form that shows when the user first starts the system.

Miniform Window Line

In the lines of the miniform window, you define the fields that will appear on the miniform.

In the **Area** field, you can select the area of the form where the field will display the data on the handheld. The final entry on the handheld is handled by the XSLT style sheet for the specific handheld.

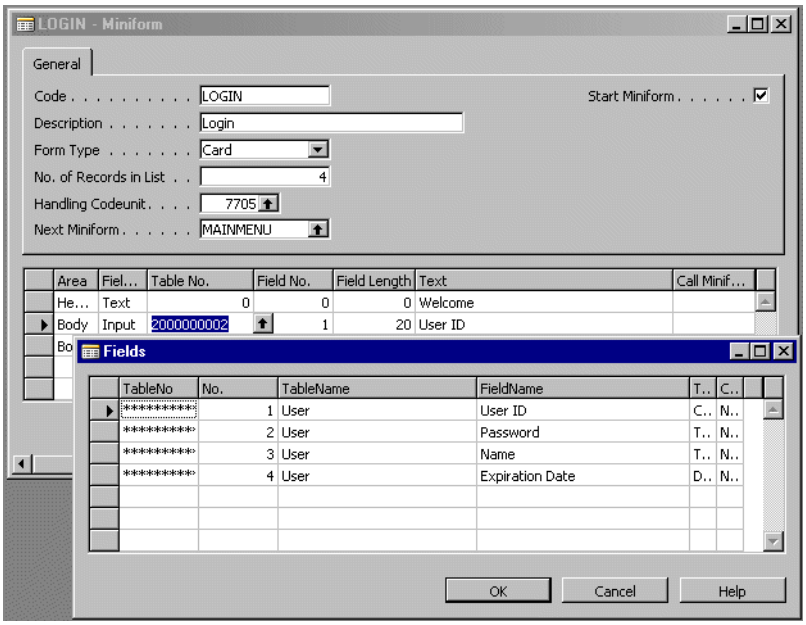
- *Header*: The information in the miniform line will be displayed in the header area of the handheld.

- *Body*: The information in the miniform line will be displayed between the header area and the footer area of the handheld.
- *Footer*: The information in the miniform line will be displayed in the footer area of the handheld.

In the **Field Type** field, you specify the type of data the field will contain.

- *Text*: Any kind of plain text like header information (main menu) or the contents of any kind of menu.
- *Input*: Data originating from the database where the user is allowed or expected to enter data on the handheld .
- *Output*: Data originating from the database that is only displayed to the user. The user on the handheld is not allowed to enter data.
- *Asterix*: Input data that should appear on the handheld with only an asterix for each character. A password field might have this field type, so that when the user enters the password, the actual password does not appear on the handheld.

The **Table No.** field contains the number of the database table from which the data is coming or to which it is entered.



The **Field No.** field contains number of the field in the database table from which the data is coming or to which it is entered.

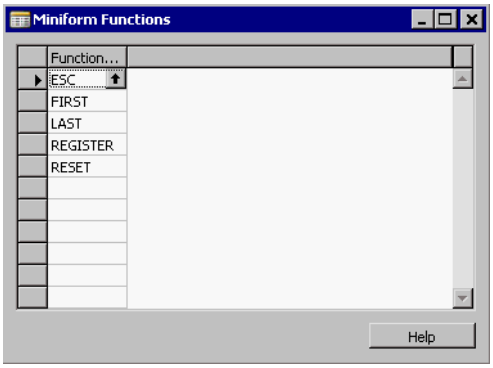
In the **Text** field, what you enter depends upon the field type:

- Field Type *Text*: Enter the plain text that will appear in the field.
- Field Types *Input*, *Output* or *Asterix*: Enter the field name that will be used as the field label on the handheld. It can be modified by the user.

You can define multiple input fields for one miniform. To meet the restriction of having only one input field on the handheld at a time, the program will send the miniform repeatedly, each time with the next input field marked as an active input field.

3.2 Functions

1 From the ***Miniform*** window, click Mini Form, Functions.

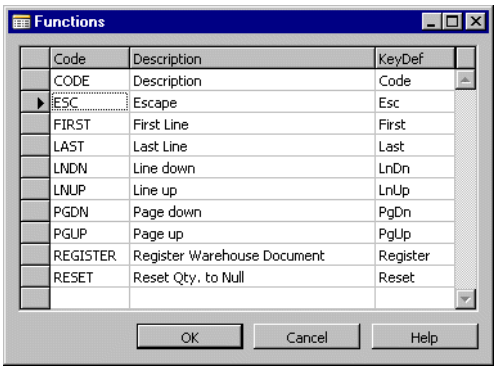


The ***Miniform Functions*** window contains the functions that are defined for each miniform.

2 Click the E**SC Function** field.

For each of these functions, corresponding code must be written in the miniform-specific codeunit. For instance, the ESC function is specified for the LOGIN miniform. A reaction for ESC must be written in the miniform-specific codeunit, 7705 Miniform Login. To implement new functions, new code must be added to the miniform-specific codeunit to handle the new function.

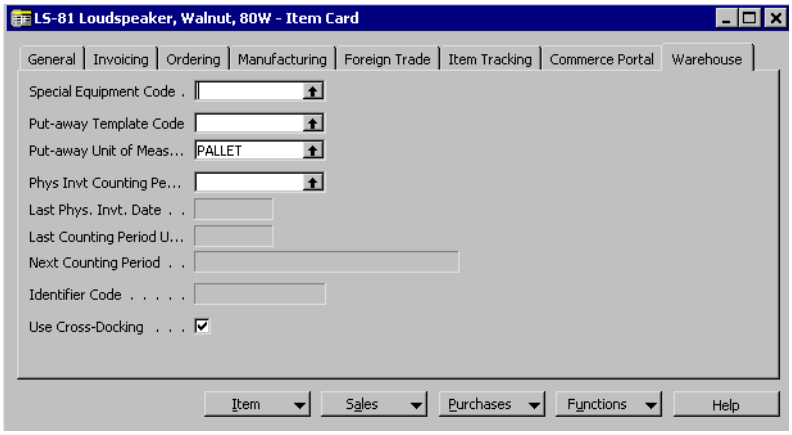
3 In the **ESC Function** field, click the lookup button to see the list of functions defined for this installation of ADCS.



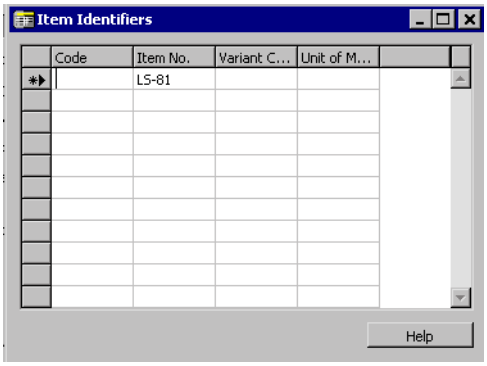
3.3 Identifier

To identify items with a bar code or any other type of identifier, you must first set up the relation between the bar code and the item numbert. You do this in the ***Item Identifier*** table, which you access from the item card.

1 In the Navigation Pane, click Purchase, Inventory & Costing, Items and in the ***Item Card***, browse to item LS-81 and then click the ***Warehouse*** tab.



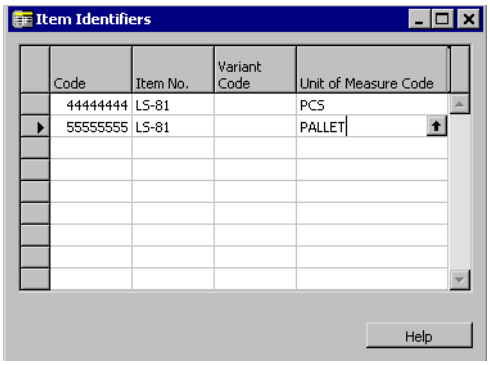
2 Click Item, Identifier and the ***Item Identifiers*** window appears.



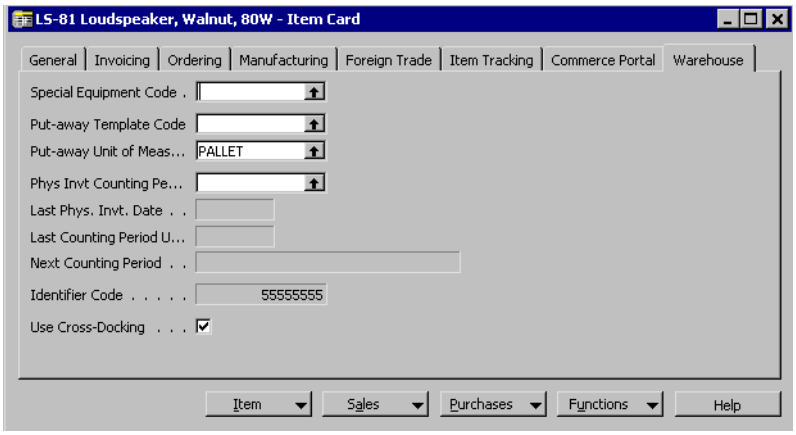
In the **Code** field, you can scan in the barcode for item LS-81. You can enter multiple codes for each item to handle cases such as item LS-81, which is handled in both pieces and pallets.

3 Enter *44444444* in the **Code** field and *PCS* in the **Unit of Measure** field.

4 In the next line, enter *55555555* in the **Code** field and *PALLETS* in the **Unit of Measure** field.



5 Close the ***Item Identifiers*** window, and you can see that the **Identifier Code** field is updated.



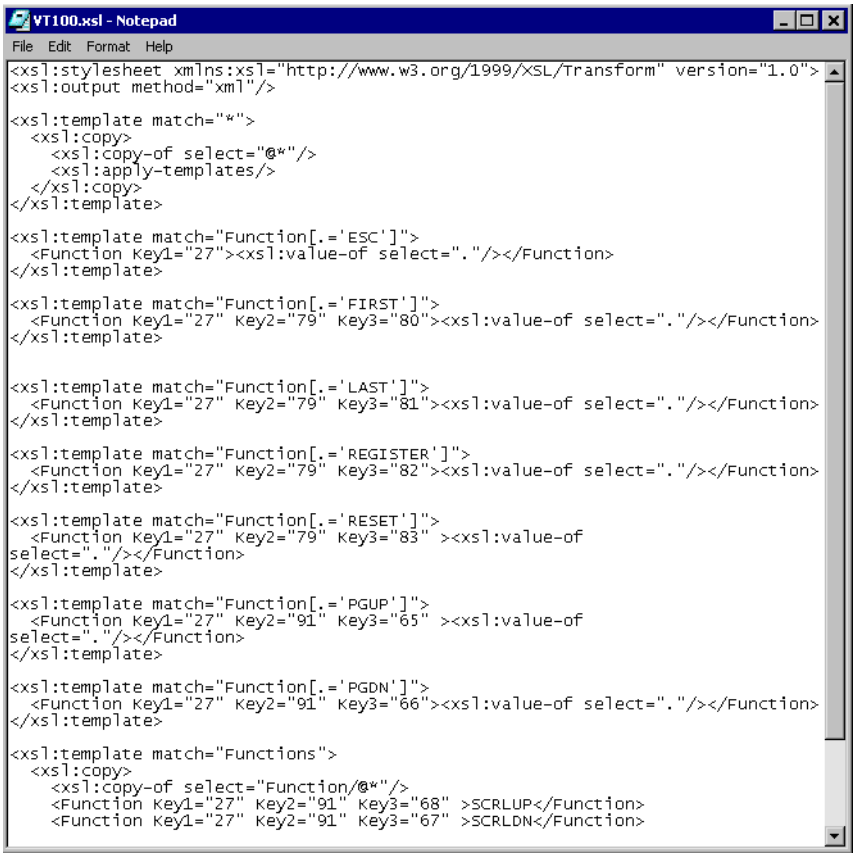
Suppose you are scanning items for a pick. When you scan the information on a pallet of item LS-81, the program will retrieve the bar code, 55555555, and enter one PALLET (or twelve pieces) of item LS-81 on the warehouse pick line. Variants of an item can also be entered in the ***Item Identifier*** table in the same way as entering the unit of measure information.

3.4 Key Functions

Many users prefer to have different key functions to operate their handheld device than the default setup from the manufacturer. It is possible to change these key functions as long as you use the key sequence. You can take the string and change it from one function to another, but you cannot change the sequence.

To access the key functions:

Open your Windows Notebook, and from your ADCS folder select file VT100.XSL.

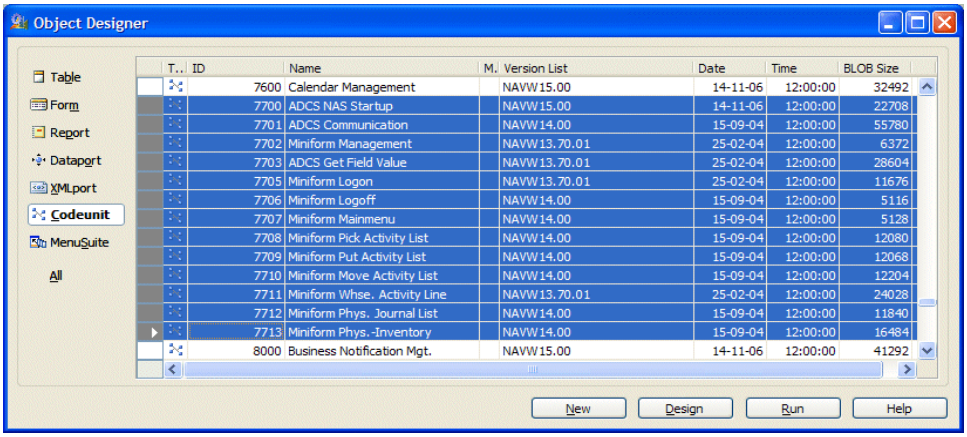


You can change the function keys by using a simple text editor.

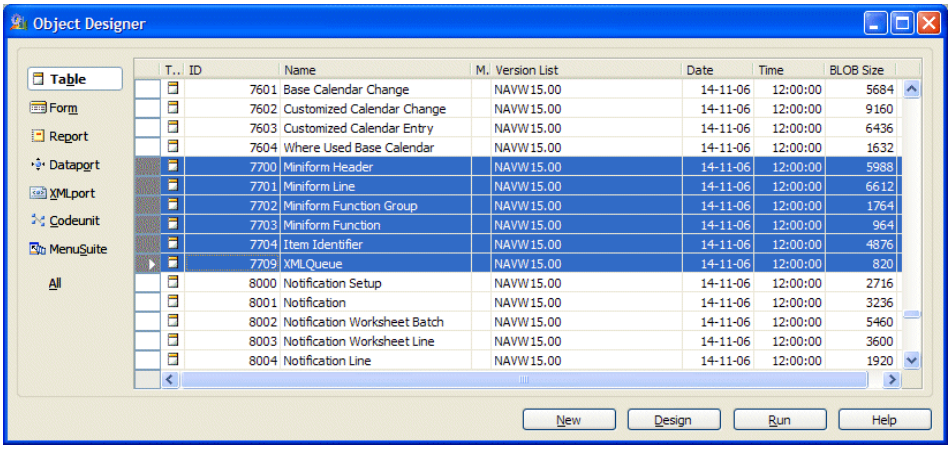
3.5 New Forms, Tables and Codeunits

In the process of creating ADCS functionality, new code has been added to the Dynamics NAV product. ADCS objects have been restricted to the 7700 number series.

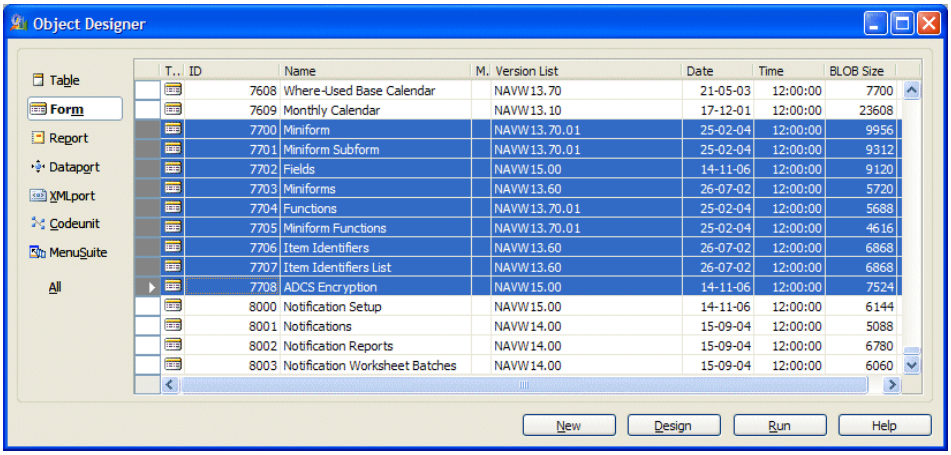
Codeunits:



Tables:



Forms:



Appendix A
Typical Problems

This appendix contains a list of typical problems that you may experience when installing and configuring Automated Data Capture Systems for Dynamics NAV.

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A.1 Typical Problems

Problem	Solution
You get an error in the Event Viewer saying: You must specify a parameter for Codeunit 1 Trigger 99. This trigger is executed when starting up Application Server for Microsoft Dynamics NAV.	Cause: You have forgotten to specify the Start-up Parameter Value ADCS ADCSID=NAS1 in the Microsoft NAV Application Server ***Management*** window. Correction: Specify the correct parameter in the Microsoft NAV Application Server ***Management*** window and try again.
You get an error in the Event Viewer saying: Trigger 99 in Codeunit 1 does not exist. This Trigger must be executed to establish connection to the Message Bus.	Cause: This error means that the Database Server either: - Is not available - Is available but can not access the database - The database is not the correct version Correction: Check that the Database Server can connect to the database by opening a normal Dynamics NAV client. Click File, Database, Open and enter localhost in the Server Name field. Click OK and the database should open. If it does not open, the Database Server can not connect to the database. You need to make sure that your connection to the database works properly before you can continue.
Everything is installed correctly, but when you start HyperTerminal nothing happens. You also get a warning in the Event Viewer saying that the TCP/IP address has not been identified.	Cause: You may not have logged onto the correct Domain Server. Solution: Make sure that you actually have a network cable attached to the PC and that you have logged on to the Domain Server that you indicated in the ***Log On*** tab for Microsoft NAV Application Server properties i.e. nsw1.

Appendix B
Terminology

This appendix contains the terminology list for Automated Data Capture Systems for Dynamics NAV.

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B.1 Terminology

Term	Description
Access Points	An Access Point is a hardware relay between a hand-held device and the PC that runs the Plug-in.
ADCS device	Automated Data Capture System: Any device such as a bar code reader or optical character reader that mechanizes the entry of information into an information system.
EAN	European Article Number, a standardized item number. This number must be uniquely assigned to a single item.
Handheld	A device similar to that as described in the definition of ADCS, but using a display as the user interface to display data and as a means to guide him.
Miniform	A way to define and display the contents and appearance of the data and functions used on the handheld.
MSXML DOM	The XML Document Object Model (DOM) provides a standardized way to access and manipulate the information stored in XML documents. The DOM application-programming interface (API) serves as a bridge between applications and XML documents.
Named Pipes	A named pipe is a named, one-way or duplex pipe for communication between the pipe server and one or more pipe clients. Named pipes can be used to provide communication between processes on the same computer or between processes on different computers across a network.
VT100	Introduced by DEC in August 1978, Video Terminal 100 was the first terminal to use a general-purpose processor for interpreting the newly published (1977) ANSI control codes (ANSI X3.64).
XML	A character-based data format for structured document exchange that is optimized for delivery over the Internet. XML consists of data elements including both the actual data content and a description of the content.
XSLT/XML Parser	A function of the MSXML DOM, which loads the XML or XSLT from a string or file into the MSXML DOM object.
XML/XSLT Multiplexer	A device that can interleave two or more independent data streams into one. With multiplexing, many messages can be transmitted simultaneously in one network channel, and several computers can retrieve data in a network simultaneously.
XSLT	A language that is used to reformat XML documents into other XML documents. A transformation in the XSLT language is expressed as well-formed XML.

Term	Description
Plug-in	An accessory software program that extends the capabilities of an existing application.

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